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Managing Water in the West

Fall 2014 HFE Planning

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Bureau of Reclamation

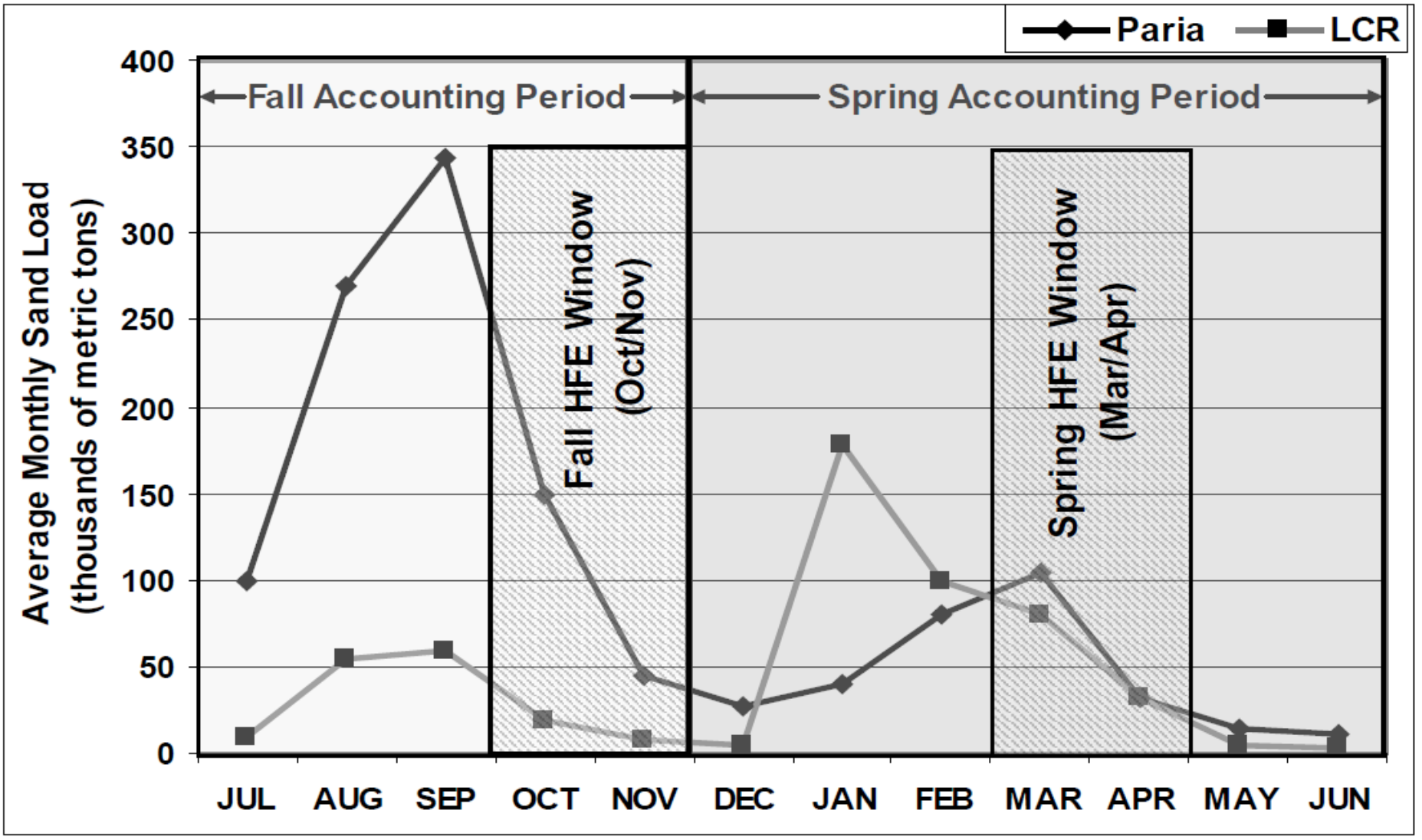
Technical Work Group
October 17, 2014

U.S. Department of the Interior
Bureau of Reclamation

HFE Decision Making Process

1. Planning and Budgeting Component
   - Annual resource status assessment
     - Annual Agency Reporting
     - GCDAMP Budget and Work Plan Process
2. Modeling Component
3. Decision and Implementation Component
   - Review Modeling Component
   - Review Status of Resources
   - Consultation with agencies and tribes, AMWG and TWG input
   - Staff Recommendation/DOI GCD Leadership Team Recommendation

Modeling Component



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HFE Protocol Parameters

Possible Timing

- March-April and October-November through 2020
- Spring HFEs will not be considered until 2015

Duration range

- 1 hr – 96 hrs (at full magnitude)
- 1 ½ days – 6 ½ days (including ramping)

Magnitude range

- 31,500 cfs – 45,000 cfs (depends on maintenance)
- 2014 projected available release for November is 37,500 cfs (7 of 8 units available)

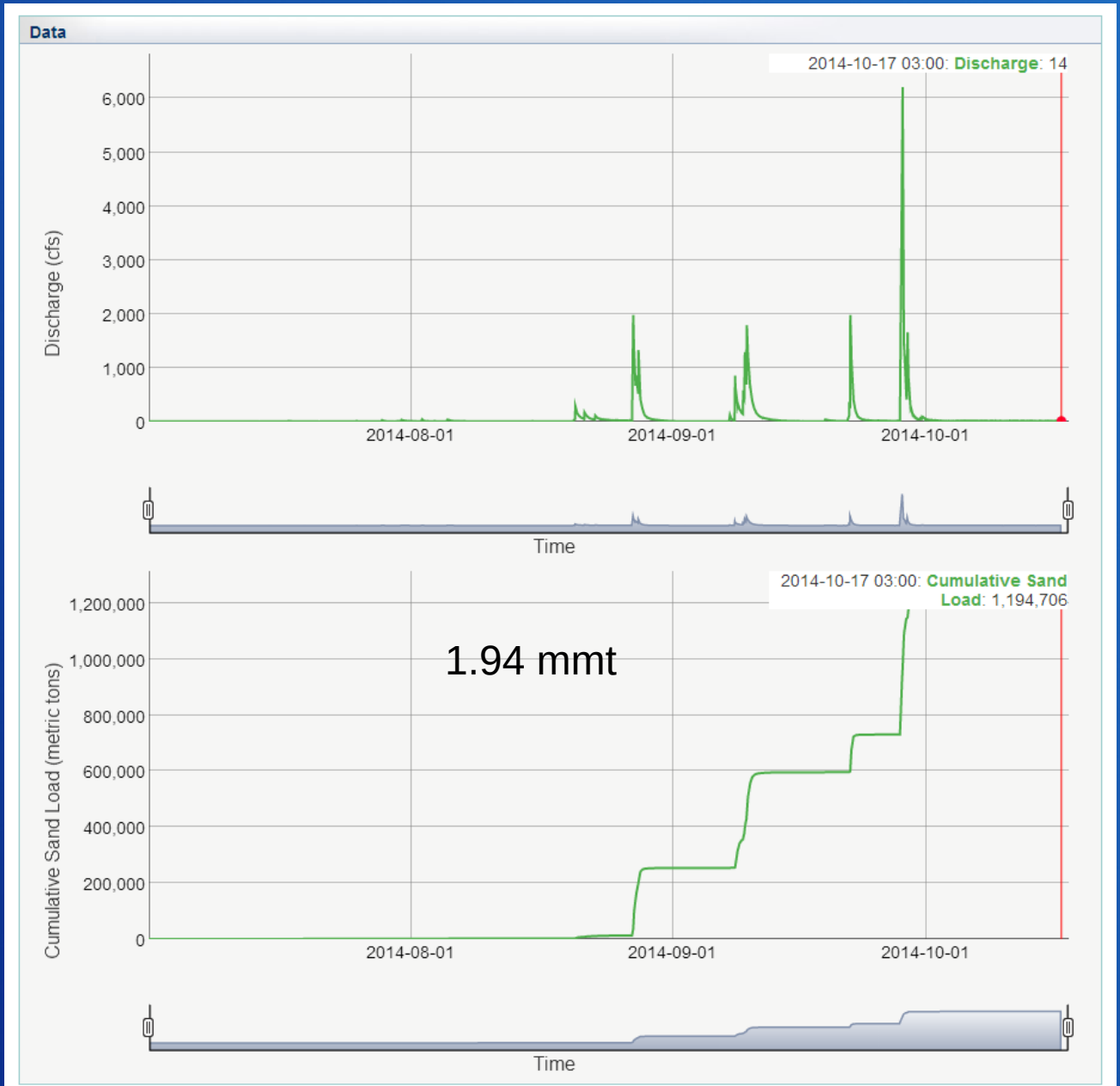
Ramping rates

- Ramping rates are defined by 1996 ROD and 1997 Glen Canyon Dam Operating Criteria (62 FR 9447, 4,000 cfs up and 1,500 cfs down)

Current conditions from the GCMRC web page as of Oct. 17

Paria River at Lees Ferry discharge since July 1

Paria River at Lees Ferry cumulative sand load since July 1



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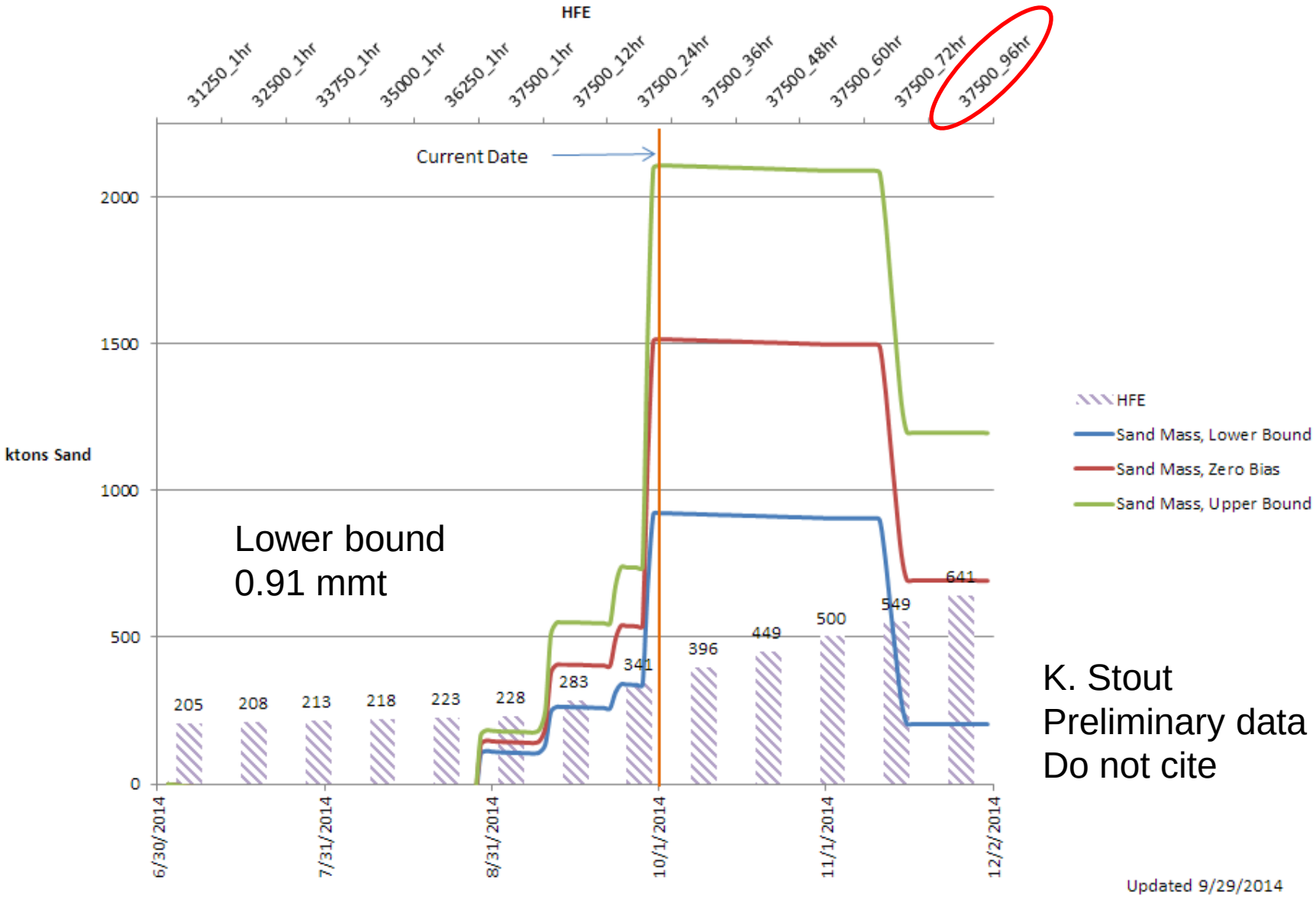
Sand Mass at Marble Canyon vs. 37,500 cfs HFE Load requirements



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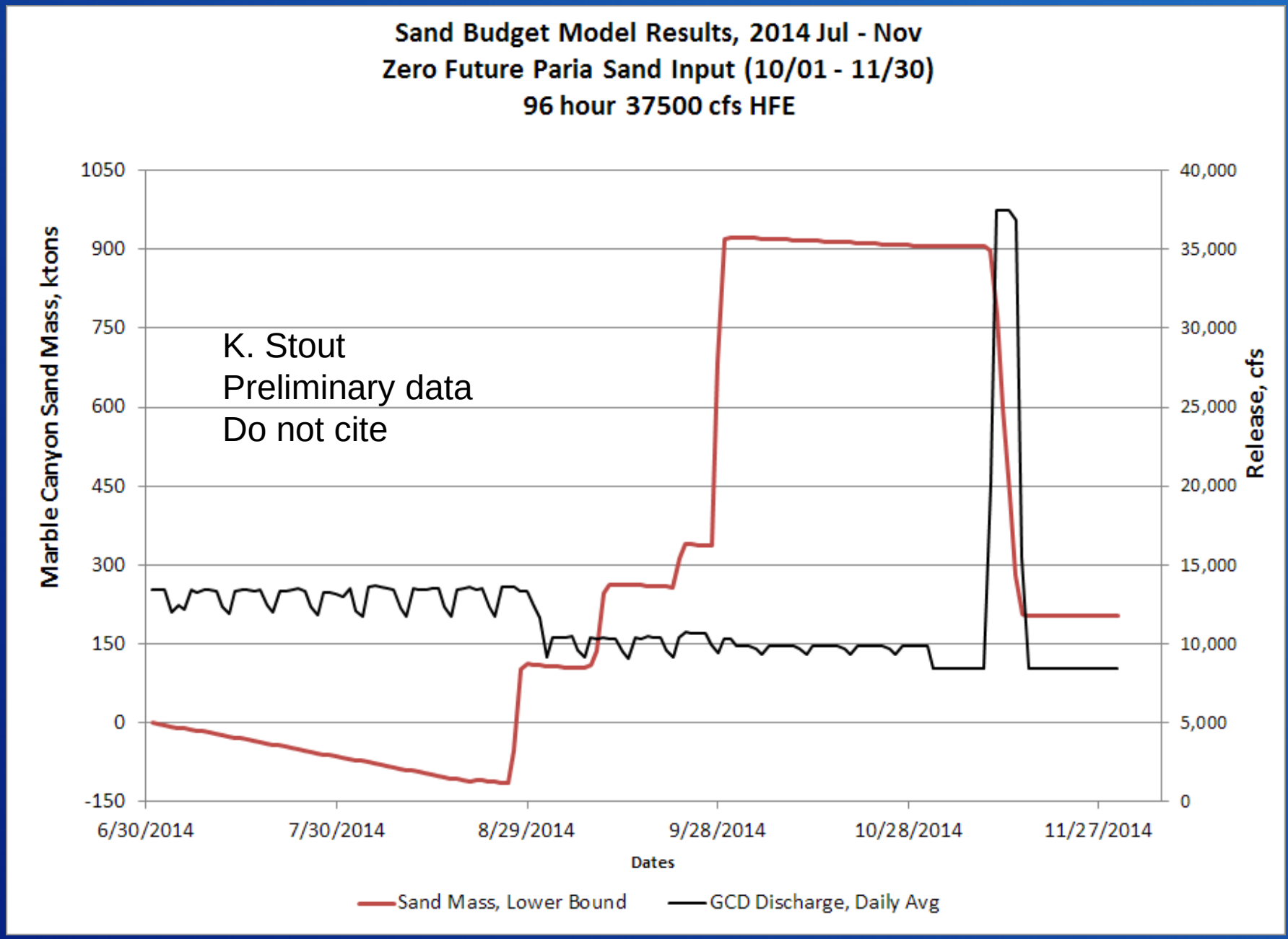

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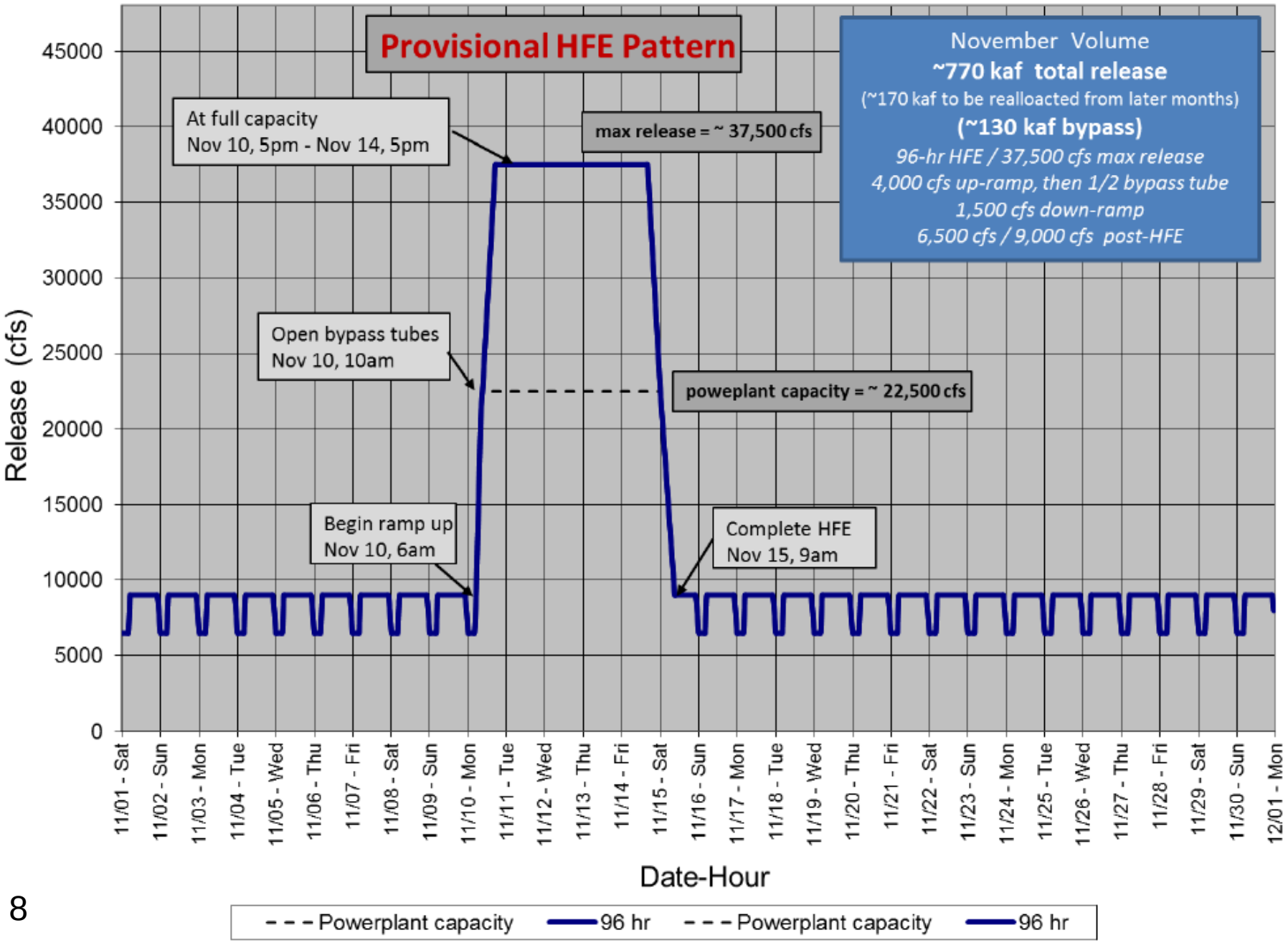
Glen Canyon Dam Possible HFE Release Pattern



Possible Monthly Release Volumes

Water Year 2015

2015 Most Probable (9.0 maf)

	Typical MLFF Pattern	Possible 9.0 Hydrograph presented at AMWG	*Possible monthlies after maintenenace considerations and discussions with Western (still maintaining 2015 Hydrograph targets)*			
			9.0 maf	96 hr HFE 9.0 maf	8.23 maf	96 hr HFE 8.23 maf
October	600	600	600	600	600	600
November	600	600	600	770	600	770
December	800	900	950	865	950	865
January	800	900	950	865	950	865
February	650	700	600	600	600	600
March	650	650	650	650	600	600
April	600	600	600	600	565	530
May	650	700	700	700	565	525
June	800	800	800	800	600	600
July	1000	1050	1050	1050	800	875
August	1050	800	800	800	800	800
September	800	700	700	700	600	600
	9000	9000	9000	9000	8230	8230

Monthly release patterns are provisional and subject to change.

Resource Status Assessment

Sediment Resources
In-channel sediment storage
Sandbar campable area
High-elevation sand deposits

Cultural Resources
Archaeological site condition and stability
Access to archaeological sites by tribes

Biological Resources
Aquatic food base
Lees Ferry trout population
Lees Ferry fishery recreation experience quality
Endangered humpback chub and other fish abundance
Riparian vegetation

Hydropower and water delivery
Water quality
Water delivery
Dam maintenance
Hydropower production and marketable capacity

Cultural Resources

- HFE-caused erosion is a consideration, most sites already mitigated.
- The HFE MOA requires reporting and consultation after HFEs
- No impacts to sites were identified from the 2012 HFE, no reports of issues with access to sites
- The MOA for the HFE Protocol requires notification to all the consulting parties at least 30 days in advance of a HFE and will consult with tribes to resolve any issues
- A 30-day notification letter notifying MOA signatories of a possible HFE in November

Reclamation met with MOA signatories Feb. 12, 2014 to review effects of 2013 HFE and found none

Hydropower/Socioeconomic Impacts

- **HFEs impact hydropower production:**
  - **Water released during an HFE counts against the annual release and is not available to be programmed in peaking releases during high demand months (HFE windows of Mar/Apr and Oct/Nov are low-demand shoulder months).**
  - **30-40% of HFE releases bypass the power plant.**
  - **Lake Powell is lowered, reducing hydrologic head.**

Western Area Power Administration estimates annual hydropower impacts of $1.777M from Fall 2014 HFE

RM 22 R – Returned to pre-HFE size by February (about same response as 2012)

RM 51 L – Still larger in May 2014 (not a “gainer” for 2012 HFE)

Sandbar Response to 2013 HFE based on Analysis of Images from Remote Cameras

- **Response immediately after 2013 HFE**
  - **Substantial Gain (deposition): 21 sandbars (50% of sites)**
  - **No substantial change: 16 sandbars (38% of sites)**
  - **Substantial Loss (erosion): 5 sandbars (12% of sites)**
- **2013 HFE compared to 2012 HFE**
  - **Sandbar larger after 2013 HFE: 9 sandbars (27% of sites)**
  - **Sandbar larger after 2012 HFE : 2 sandbars (6% of sites)**
  - **About the same: 22 sandbars (67% of sites)**

Response to 2013 HFE similar to previous HFEs: substantial deposition followed by erosion of about half the new deposits with 6 months

Preliminary data

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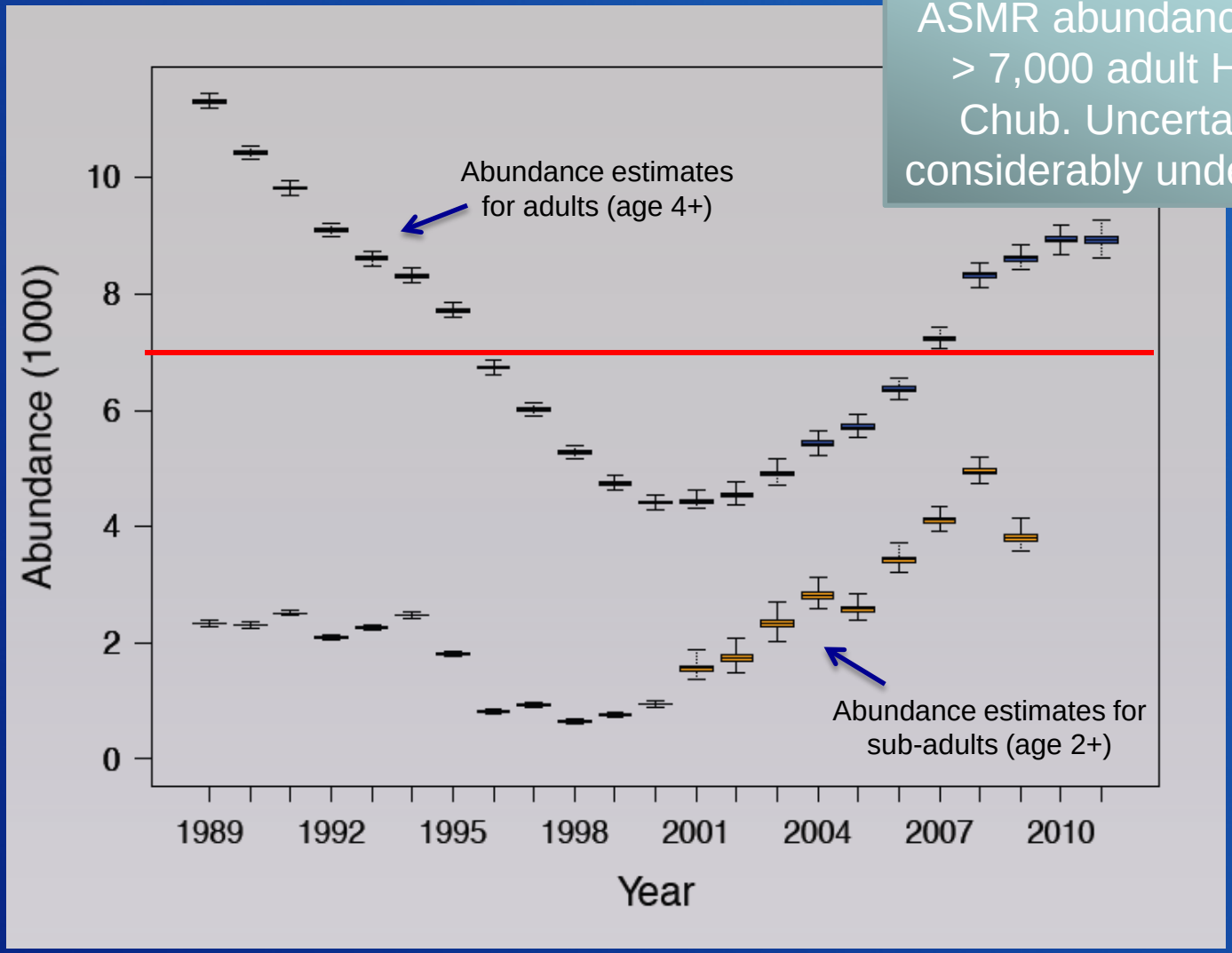
Adult and Sub-Adult Humpback Chub Abundance Estimates

ASMR abundance estimate: > 7,000 adult Humpback Chub. Uncertainty likely considerably underestimated.

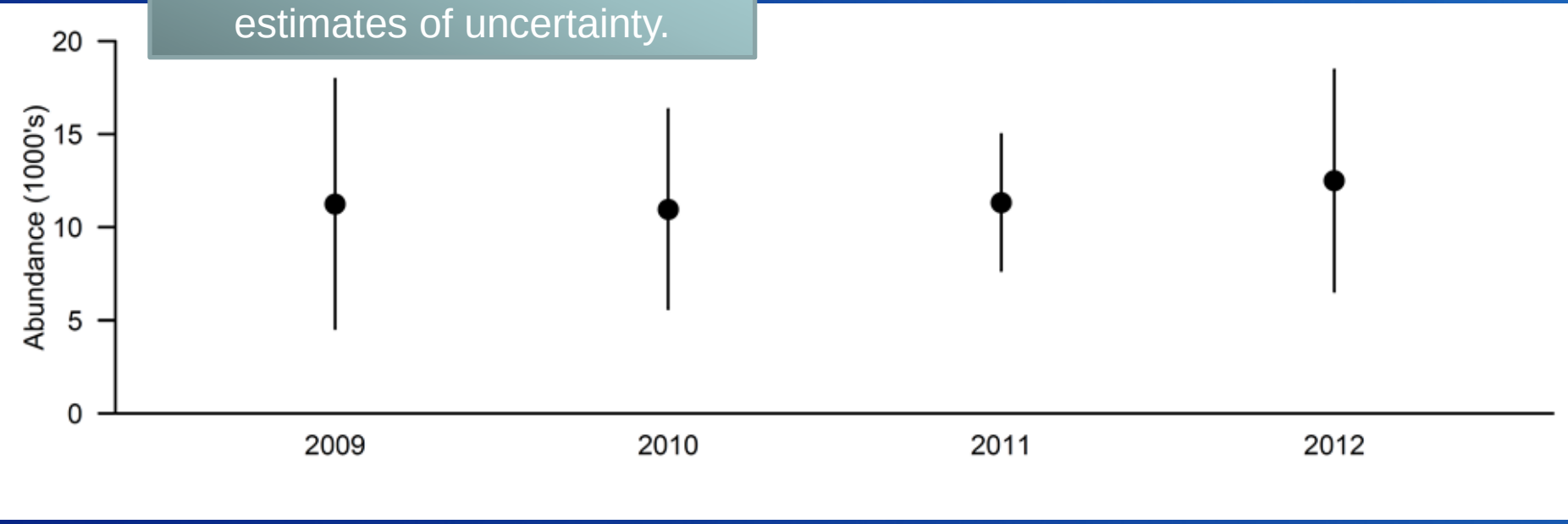


(S. Martell, preliminary data, do not cite)

USGS RECLAMATION

Adult Humpback Chub Abundance Estimates: Multistate Population Model

Suggests adult Humpback Chub abundance stable from 2009 – 2012. Confidence intervals provide reasonable estimates of uncertainty.



(Yackulic et al. 2014)

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Annual spring abundances of humpback chub ≥ 150 mm and ≥ 200 mm in lower 13.6 km of LCR

2014 spring estimates indicate Humpback Chub abundance stable in the LCR

(Preliminary data from VanHaverbeke et al. 2014, Do Not Cite)

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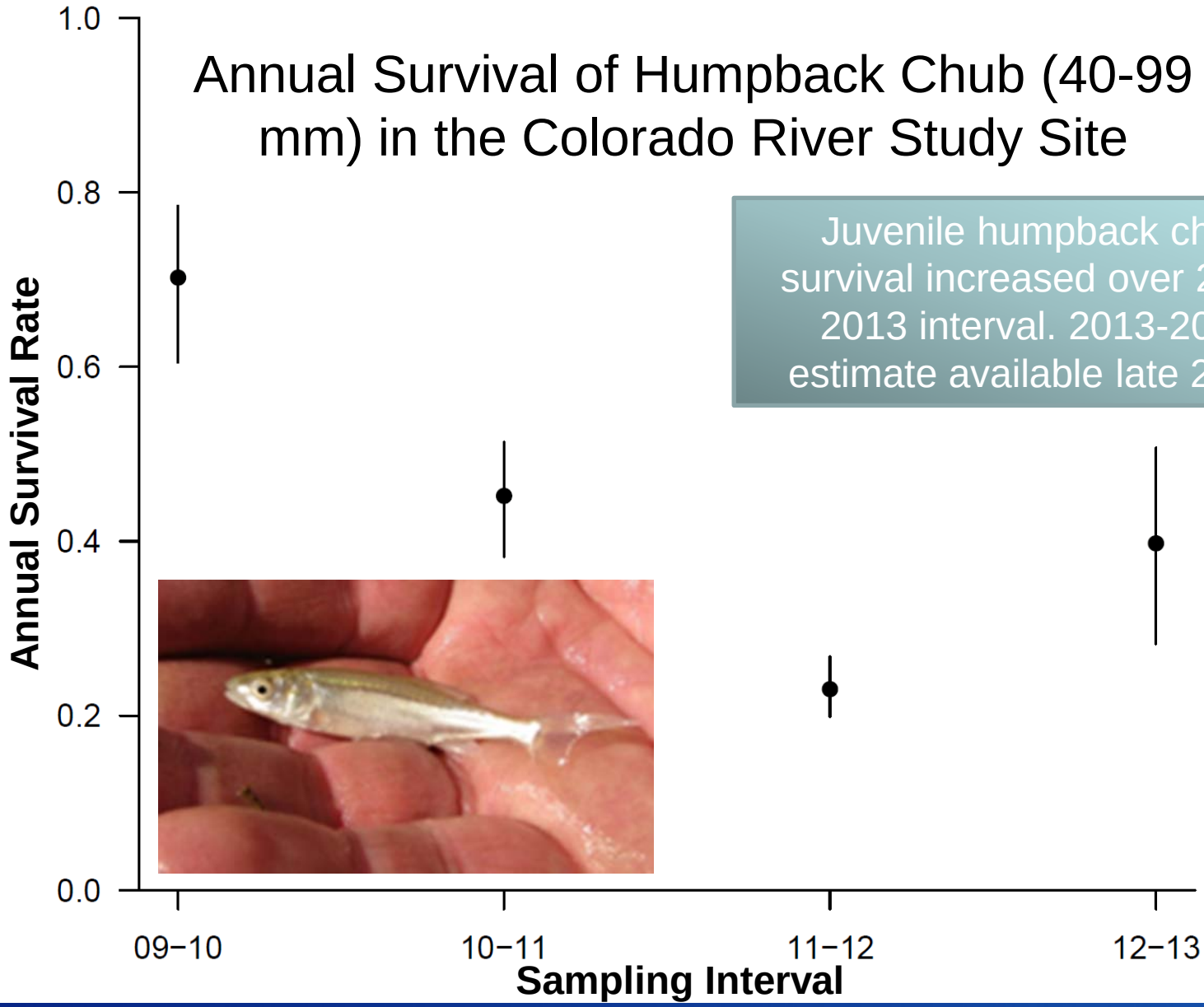
Annual Survival of Humpback Chub (40-99 mm) in the Colorado River Study Site



Juvenile humpback chub survival increased over 2012-2013 interval. 2013-2014 estimate available late 2014.

(Preliminary Data from Yackulic 2014. Do Not Cite.)

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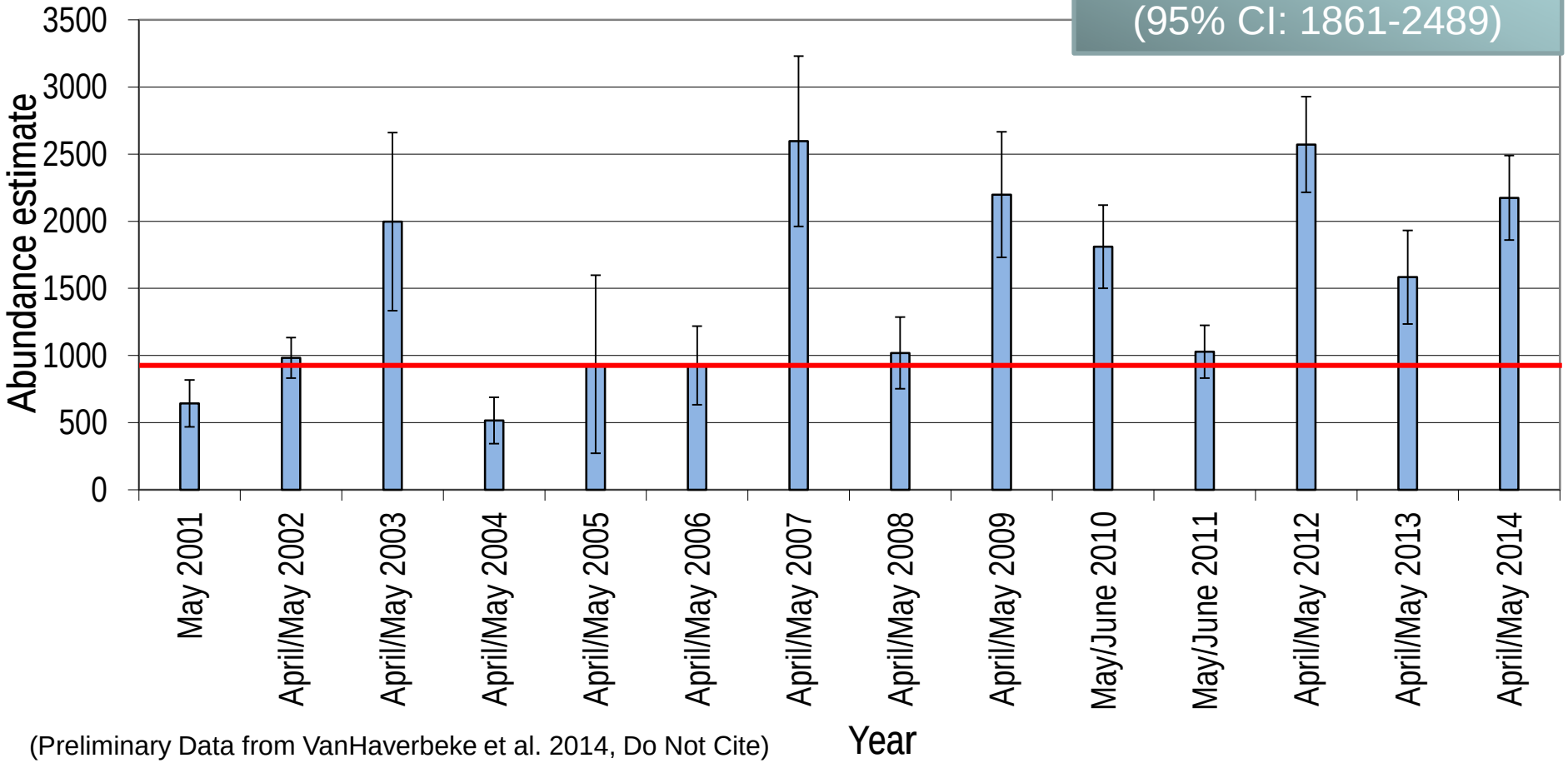
Spring LCR 150-199 mm humpback chub abundance estimates

2014 spring abundance estimate of 150-199 mm HBC = 2175
(95% CI: 1861-2489)



(Preliminary Data from VanHaverbeke et al. 2014, Do Not Cite)

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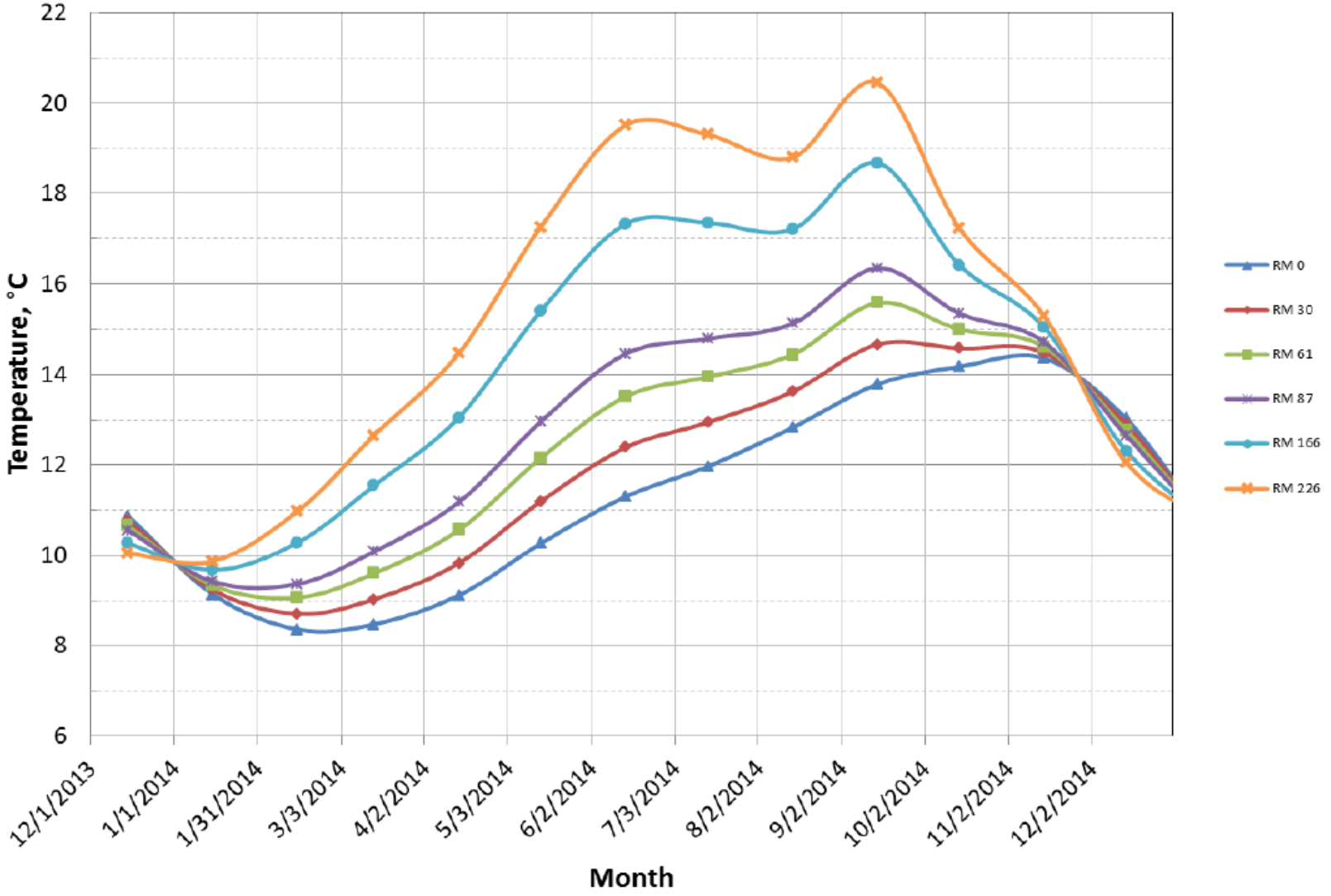
Colorado River, Grand Canyon Water Temperatures

Projections based on September 2014, Most Probable Hydrology



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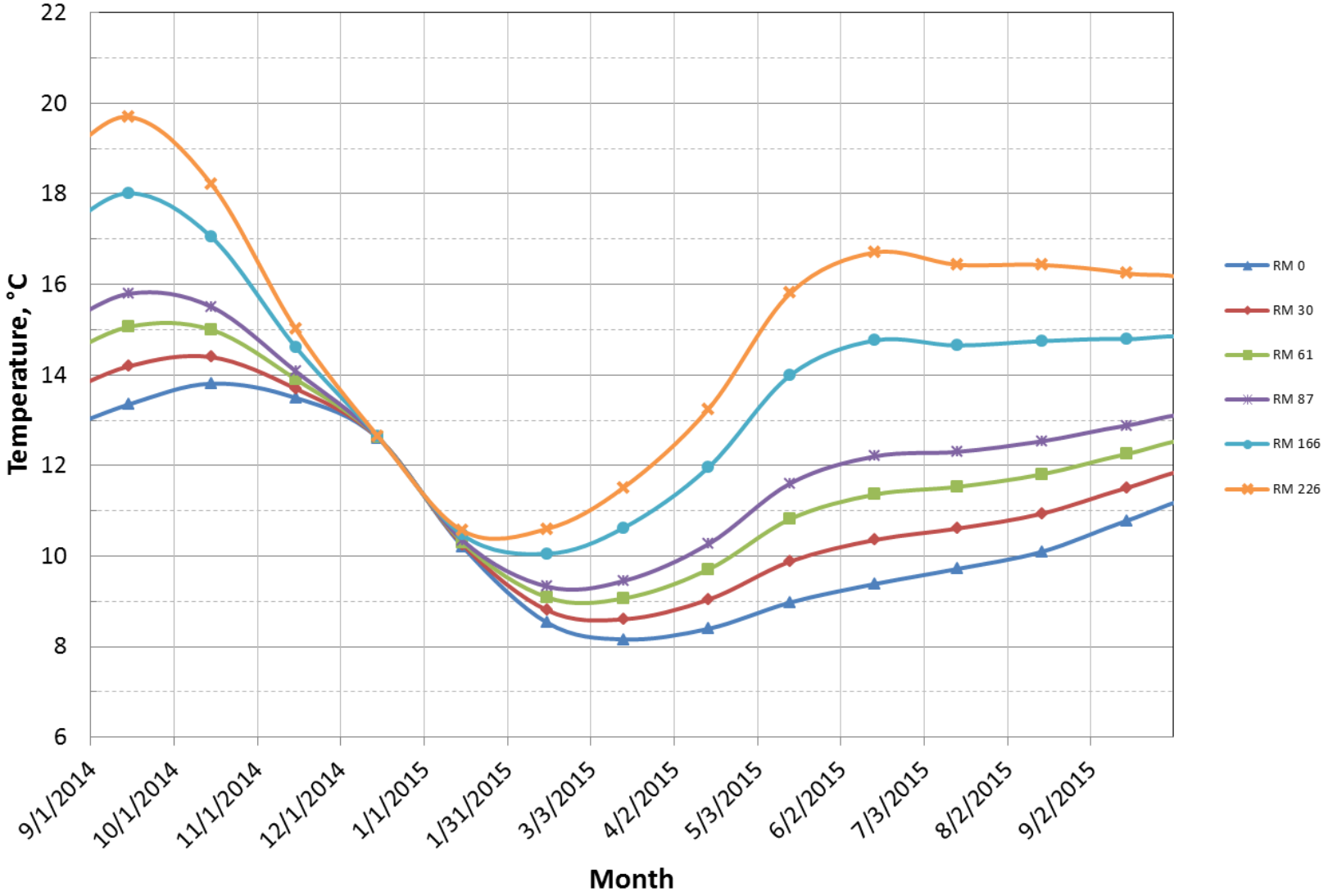

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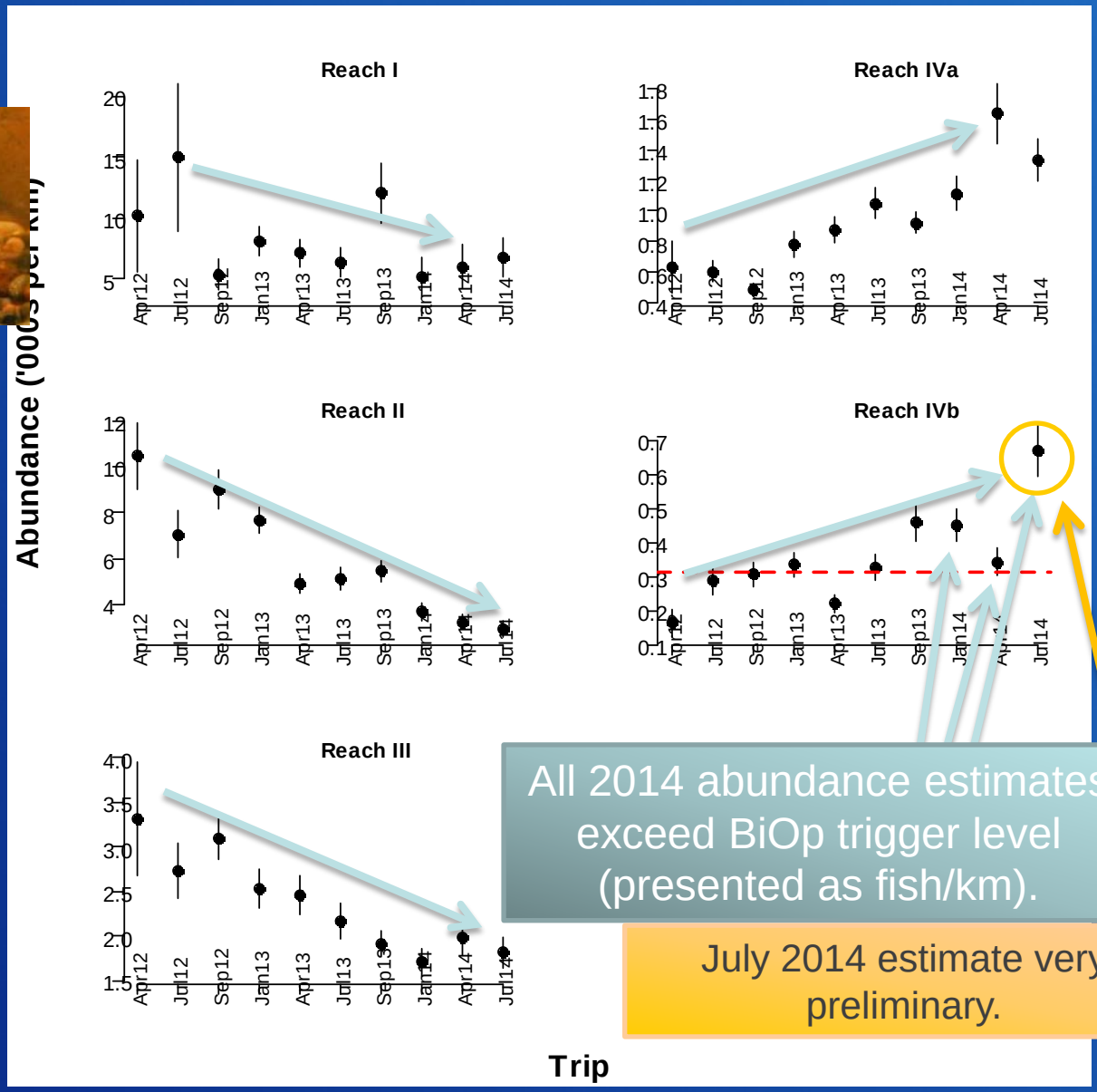
Rainbow Trout Abundance By Reach



I – Glen Canyon/Lees Ferry

II – House Rock

III – Buck Farm

IVa – Upstream of LCR

IVb – Downstream of LCR

All 2014 abundance estimates exceed BiOp trigger level (presented as fish/km).

July 2014 estimate very preliminary.

(Preliminary Data from Korman and Yard 2014. Do Not Cite.)

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2011 USFWS Biological Opinion Non-native Fish Control Trigger

- Adult humpback chub <7000 fish? No
- OR
- ALL THREE? No
  - 3 of 5 years 150-199 mm humpback chub in the LCR drops below 910? No
  - Temperature <12° C for 2 consecutive years at LCR? No
  - Annual survival of 40-99 mm humpback chub in JCM drops 25% from preceding year? TBD

2011 USFWS Biological Opinion Non-native Fish Control Trigger

- **AND**
- **Rainbow trout abundance over 760?**

Yes

Open model estimates exceed threshold for all trips to date in 2014
(Korman and Yard, preliminary data)

- **AND**
- **Brown trout abundance over 50?**

Unknown

2014 catches lower than in 2013, only 7 total caught in Jul. 2014 – catches too low to generate abundance estimate
(Yard and Korman, preliminary data)

2014 HFE Summary and Next Steps

1. Resource conditions support a 2014 HFE
2. 37,500 cfs for 96 hours, early-mid Nov. 2014
3. Timing TBD, week of Nov. 9
4. 30-day HFE MOA letter has gone out
5. TWG Webinar Oct. 17 11am-1pm mdt
6. Leadership Team meeting week of Oct. 20
7. US Fish and Wildlife Service report in December
8. If an HFE occurs in FY 2014, convene a workshop to review results of first 3 HFEs in 2015